FESHM 3020: INCIDENT INVESTIGATION AND ANALYSIS

Revision History

Author	Description of Change	Revision Date
Bridget Iverson	• Addition of Radiation Safety Officer (RSO) responsibilities	June 2020
Dave Baird	• Removed reference to Improvements Database and replaced with ESH&Q Section's Quarterly Summaries • Clarified chapter responsibilities in light of the creation of the Incident Analysis Team (IAT). • Provided additional Investigation and Analysis guidance • Forms and flowchart have been updated	November 2018
John P. Cassidy	• Added HPI language to Sections 1, 4, 5.4, 5.6, and 6.0. • Added the Incident Reporting Process Flowchart. • Added requirement to conduct and document HPI evaluations for recordable, first aid and near miss cases. • Updated the IIP Subcommittee duties. • Updated the Investigation and Analysis Procedure to include the documentation of reports.	July 2013
John P. Cassidy	Employees will only have to report to medical after a motor vehicle incident if there is an injury.	July 2011
Nancy Grossman	Definitions and terms were standardized between each of the FESHM chapters and the CAPA procedure. Particularly Corrective Action, Preventive Action, Root Cause Analysis, ESHTRK became iTrack, Causal analysis was replaced with root cause analysis and carried forward. Also added reference to (1004.1001 Fermilab Corrective & Preventive Action Procedure) and (1004.1002 Fermilab Root Cause Analysis Procedure) if not already present. In 5.6, added items from the Injury and Illness Subcommittee charter.	March 2011

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1.0 INTRODUCTION

This chapter outlines the incident/near miss reporting, investigation, and root cause analysis procedures. There are many benefits from an incident and near miss investigation, with one ultimate purpose – **Prevention of future injuries and incidents.** For this reason, Human Performance Improvement (HPI) reports should be written so that persons not familiar with the incident may understand and gain knowledge from the report.

Incident/near miss prevention is most effective when all incidents and near misses are promptly reported, thoroughly investigated, the root causes identified, and corrective and preventive actions developed and implemented. An HPI Review must be completed within a reasonable amount of time following knowledge of an incident. This will allow for accurate and effective trending analysis on a lab-wide basis.

2.0 DEFINITIONS AND ABBREVIATIONS

Corrective Action - Action to eliminate the cause of a detected nonconformance or undesirable situation.

Note: *There can be more than one cause for a nonconformance. Corrective action is taken to prevent recurrence whereas preventive action is taken to prevent occurrence.*

Incident - An unplanned event that interrupts the completion of an activity or causes injury and/or property/vehicle damage or a near miss. An incident sometimes referred to as an "accident".

CAIRS - Computerized Accident Incident Reporting System

Human Performance Improvement (HPI) - A set of concepts and principles associated with a performance model that illustrates the organizational context of human performance. HPI is a system that comprises a network of elements working together to produce repeatable outcomes. The system encompasses organizational factors, job-site conditions, individual behavior, and results.*

**From Human Performance Improvement Handbook, Volume 1:Concepts and Principles, DOE HDBK-1028-2009, June 2009.*

HPI Review Form – A form used to document incidents using HPI principles.

Investigation Team – Team responsible for conducting and documenting the incident investigation. The team usually includes the DSO as the lead, the employee involved in the incident, the employee's supervisor as well as other Subject Matter Experts (SMEs) from the respective Division/Section/Project.

Lessons Learned (LL) – A best practice that is captured and shared to promote repeat application or an adverse work practice or experience that is captured and shared to prevent recurrence.

Motorized Vehicle - For the purpose of this chapter, a motorized vehicle is any conveyance that transports people or objects. This includes automobiles, trucks, mobile cranes, fork trucks, golf carts, tow motors, magnet movers, riding lawn mowers, tractors and electric carts.

Near Miss - An unplanned event that did not result in injury, illness, or damage but had the potential to do so. Only a break in the chain of events prevented an injury, fatality or damage. Other familiar terms for these events is a "close call", or in the case of moving objects, "near collision".

Nonconformance - Non-fulfillment of a requirement. A non-conformance can be a deviation from work standards, practices, procedures, legal requirements or applicable code of federal regulations.

OSHA - Occupational Safety and Health Administration. An agency under the US Dept. of Labor.

OSHA Recordable Injury/Illness - Any occupational injury or illness resulting in death, days away from work, restricted work or transfer to another job, or medical treatment beyond first aid.

Preventive Action - Action to eliminate the cause of a potential nonconformance or other undesirable potential situation. Preventive action is taken to prevent occurrence whereas corrective action is taken to prevent recurrence.

Root Cause - An identified reason for the presence of a defect or problem or the source of origin of an event. The most basic reason, which if eliminated, would prevent recurrence.

SME - Subject Matter Expert: The Subject Matter Expert is that individual who exhibits the highest level of expertise in performing a specialized job, task, or skill within the organization.

3.0 RESPONSIBILITIES

3.1 Employees

- Report to their supervisor any injuries/illnesses or any involvement in an incident regardless of how minor it may initially appear.
- Report motorized vehicle incidents.
- Report near-miss events.
- Deliver the Injury/Illness Evaluation Form-5 to the supervisor immediately upon return from the Occupational Medical Office. A Form-5 is used to inform the supervisor of any medical restrictions placed upon the employee.
- Complete the Incident Involvement Form portion of the Injury/Illness Evaluation Form-5 as soon as possible for any incident or near miss in which they were involved or witnessed.
- Participate in the investigation team as directed by the supervisor.

3.2 Supervisors

- Direct injured employees to the Occupational Medical Office. Dial x3131 if necessary.
- Immediately report any incident or near miss to your line manager and Division Safety Officer (DSO).
- Complete the Supervisor Incident Investigation Report Form and submit to the DSO. This form must be completed within 2 working days of the incident. The form may be used for “near miss” incidents.
- Review the Form-5. If restrictions have been identified, determine if such restrictions will affect the employee's ability to perform normally assigned duties.

- Complete and sign the Form-5 and forward it to the DSO for signature. The original form with all signatures must be returned to the Medial Office, MS 204, within 5 working days.
- Ensure the preventive and corrective actions identified by the incident investigation are implemented.
- Lead/Participate in investigation team as appropriate.

3.3 Division/Section Heads and Project Managers (D/S/P)

- Ensure investigations are completed within a reasonable amount time.
- Review the final incident investigation report to ensure that the root, direct and contributing causes and the corrective and preventive actions are appropriate.

3.4 Division Safety Officer (DSO)

- Report any incident or near miss to the Chief Safety Officer (CSO) and Deputy CSO.
- Lead/participate in the investigation team. Investigation teams should consist of 1 SME and 1 DSO at a minimum; promote the inclusion of supervisors as participants of the investigation team.
- Review the Form-5 and provide signature. If medical restrictions have been placed on the employee, the DSO signature on the Form-5 signifies concurrence with the supervisor's assessment of whether the restrictions are job limiting. The DSO then forwards the Form-5 to the Occupational Medical Office.
- For OSHA Recordable cases, enter investigation report containing all the information required by the OSHA 300 into CAIRS database within 7 days of incident. This allows for the submission of cases to the DOE database by the 15th or last day of each month.
- For OSHA Recordable Cases, complete an HPI Review assuring a root cause analysis is performed using the Causal Analysis Tree found in FESHM 3010 and Human Performance Improvement (HPI) fundamentals. QAM 12050 "Root Cause Analysis" can also be used as a tool to assist in the root cause analysis. Assure that corrective and preventive actions are sufficient to address these causal factors. Note: Although HPI Reviews for OSHA Recordable Cases is the norm, there may be some instances where an HPI Review is unnecessary to obtain a clear understanding of the incident. In these cases, the Incident Analysis Team (IAT) will make the determination as to whether an HPI review is warranted.
- For first aid cases, enter pertinent information into the CAIRS database. The extent of the information required will be proportional to the potential for the injury having been more serious. A root cause analysis review using the HPI Review Form may be warranted depending on the nature of the first aid case. This determination will be made by the IAT.
- For near misses, enter into the CAIRS database a summary of the incident, root cause(s), findings if applicable, and any corrective and preventive actions taken. Root cause analysis via the HPI Review Form may be warranted depending on the nature of the event. This determination will be made by the IAT.
- Enter into iTrack the gaps identified, the corresponding corrective actions, as well as any preventive actions, and link the iTrack report to the CAIRS report.
- Correlate all non-conformances to requirements found in the Lab's Policies and procedures.

3.5 Assigned Radiation Safety Officer (RSO)

- Serve as the lead for radiological incidents in their area of responsibility. Respond to abnormal radiological situations per approved Radiation Physics procedures. Report any incident or near miss to the Chief Safety Officer (CSO) and Senior Radiation Safety Officer (SRSO).
- Lead/participate in the investigation team. Investigation teams should consist of 1 SME and 1 DSO at a minimum; promote the inclusion of supervisors as participants of the investigation team.

3.6 Chief Safety Officer (CSO)

- Maintain a staff of formally trained incident investigators to provide investigation technical assistance when requested.
- Develop and maintain incident investigation/analysis policies.
- Ensure notification of the Laboratory Director, Office of Communication, the Legal Office and the DOE Fermi Site Office (FSO) of any incident that may result in an independent DOE investigation.
- Review all completed incident investigation forms.
- Submit completed CAIRS forms and hours worked to DOE, as required by DOE O 231.1B – *Environmental, Safety and Health Reporting*.
- Maintain the OSHA 300 form.
- Maintain CAIRS database for trending, training, and statistical data such as incident rates.
- Review incident reports for adverse programmatic trends that should be reported to DOE through the Noncompliance Tracking System (FESHM 3030).
- Support the Directorate by taking the lead on the investigative readiness effort in the event that an incident is severe enough to warrant an independent DOE investigation (Refer to DOE Order 225.1B – *Accident Investigations*). Control of the incident scene will be given to the ESH&Q Section. Maintain close coordination with the DOE investigation board chairperson to ensure efficient transfer of information and continued support of DOE activities.

3.7 Incident Analysis Team (IAT)

- Review Latest CAIRS reports and discuss HPI Review applicability.
    - The criteria for conducting an HPI Review are described in Section 5.0.
    - The IAT or Incident Prevention Subcommittee (IPS) may determine an HPI evaluation is necessary if the circumstances of an event would answer YES to any of the following questions.
        - Was the immediate cause of the incident concerning or could the immediate cause have resulted in a more detrimental effect? E.g., A first aid injury caused by 2,200 lbs of magnets falling to the floor.
        - Are there broader implications to this event? E.g., An incident while performing an activity that occurs in many departments or across Divisions/Sections/Projects.
        - Are there missing pieces or concerns that which precludes the ability to understand the whole story?
        - Would FNAL benefit from conducting an HPI of this incident?

- Review and comment on draft HPIs and provide feedback to Lead HPI Investigator for follow-up.

  - The IAT shall review all new "final draft" HPI reports.
  - The IAT will meet with the Lead investigator and take a deep dive into the investigation. The Lead investigator will address any unanswered questions or other causes of concern.
  - Conduct HPI/CAIRS Database analysis to develop proactive incident prevention strategies, this would include steps to address Latent Organizational Weaknesses and Error Precursors.
- Periodically review HPI-related metrics to identify trends and formulate actions to address those trends.

3.8 Incident Prevention Subcommittee (IPS)

- Provide guidance to the laboratory concerning the prevention of incidents.
- Respond to requests from, and suggest items for action to, the Chair of the Fermilab ES&H Committee (FESHCom) and to the Chief Safety Officer (CSO).
- Add the necessary HPI information into the CAIRS and iTrack database Systems.
- If applicable, enter lessons learned into database.
- Through formal presentations, share information from investigations lab-wide, including root causes, corrective and preventative actions.
- Identify trends to the Fermilab ES&H Committee (FESHCom).
- Identify and recommend changes in policies and procedures to FESHCom to enhance lab-wide safety performance.
- For further detailed requirements of the IPS please see the IPS Charter.

3.9 Occupational Medical Office

- Assess occupational injuries and illnesses, provide necessary treatment, and place medical restrictions, when necessary, to ensure quick and complete recovery.
- Inform the supervisor and DSO of each employee who has reported to the Occupational Medical Office with an injury or illness. This is normally done through electronic mail.
- Enter incident information into the CAIRS database if,
  - the incident resulted in an occupational injury, or
  - the incident is alleged by the employee to be the result of an occupational injury or illness.
- Provide the Incident Involvement Form to the employee for completion.
- Provide the employee with a Form-5 to document the visit to the Occupational Medical Office.
- Retain all completed Form-5's in the employee file.
- Maintain injury/illness database (for worker's compensation purposes).
- Monitor cases with continuing lost or restricted time to ensure restrictions are accommodated. Update CAIRS database as necessary to reflect accurate days lost or restricted, or other new information.

4.0 PROGRAM DESCRIPTION

All incidents and near misses shall be investigated, analyzed, and recorded. This also applies to property damage and vehicle incidents. The depth of a near miss investigation is dependent on its potential to cause severe damage or personal injury should the incident occur. Those incident reports that meet the DOE reporting criteria will be submitted to DOE.

4.1 Lessons Learned

The ESH&Q Section will review incident reports to identify whether there are lessons learned to be shared throughout the Laboratory or externally with other US DOE Laboratories. Each D/S/P will develop the written lessons learned and enter the information in the Lessons Learned Database. The ESH&Q Section will review CAIRS and other investigation and lessons learned reports to identify trends. The results will be shared with D/S/P representatives in the Incident Prevention Subcommittee and other subcommittees of FESHCom. Other forms of communication may be used as well.

5.0 INVESTIGATION and ANALYSIS PROCEDURE

Incident investigations and analyses are conducted to identify unsafe acts and conditions and then formulate corrective and preventive actions to prevent recurrence. Besides a root cause investigation, CAIRS reports must also state corrective and preventive actions identified during the investigation. The process described below is to be applied to all incidents, first aid cases and near misses:

- Preserve the incident scene, if necessary
- Photograph the incident scene, if necessary
- Supervisor completes incident report
- Interview witnesses; routine questions to ask during a review include:
  - Does a Standard Operating Procedure (SOP) exist or was a Hazard Analysis (HA) written and approved for the work?
  - If the job requires the use of Personal Protective Equipment (PPE), was a written PPE Assessment conducted? If not, are the PPE requirements identified in the SOP or HA?
  - Are the employees trained on how to perform the work task?
  - Is all relevant training identified by their supervisor in TRAIN? Is the employee current?
  - What non-conformances or recommendations can be placed on ESH&Q or D/S/P to improve the program, for example training program, training improvements, equipment modifications, etc.
- Collect evidence
- Using the HPI Review Form:
  - Analyze incident, consulting with SMEs as needed.
  - Identify causes (root-direct-contributing)
  - Determine needed actions (corrective-preventive)
- Make CAIRS data entry
- Enter the final HPI Review into the HPI database.
- Enter all issues where there are corrective and preventive actions into iTrack and link the report from the HPI database.
- Identify lessons learned

6.0 REFERENCES

DOE O 231.1-1B - Environment, Safety and Health Reporting Manual

DOE O 225.1B – Accident Investigations

Incident Prevention Subcommittee Charter

QAM Chapter 12010 - Contractor Assurance Lessons Learned Program

QAM Chapter 12040 - Corrective & Preventive Actions Procedure

QAM Chapter 12050 - Root Cause Analysis Procedure

Quality Assurance Manual